REMARKS

Claims 2-10, 12-23, and 26-82 are pending, with claims 1, 12, 26, 27, 36, 42, 48, and 54 being in independent form. By the present amendment, claims 1, 12, 26, 27, 36, 42, 48, and 54 have been amended, and new claims 75-82 are added.

In the Office Action, claims 2-6, 12-23, 26-28, 30-32, 44, 60-61, and 65-66 have been rejected for obviousness over U.S. Patent No. 6,333,968 to Whitlock et al. ("Whitlock) in view of U.S. Patent No. 5,773,921 to Keesmann et al. ("Keesmann"). Claims 2-10, 27, 29, 33-38, 40-43, 45-59, 62-64, and 67-74 have been rejected for obviousness over U.S. Patent No. 5,305,363 to Burke et al. ("Burke") in view of Keesmann. The Applicants believe this Amendment overcomes the cited rejections for the following reasons.

The Applicants have amended each of the independent claims of the application to recite, among other things, a field emissive material having an emitted electron current density of at least $1mA/cm^2$ when the cathode is subjected to an applied electrical field of at least 2V/μm. In support of the claim amendments, the Applicants are adding FIG. 4 of U.S. Patent Application No. 09/679,303, now U.S. Patent No. 6,553,096, which is the parent application to this application and which was expressly incorporated into this application by reference upon filing, as new FIG. 9. FIG. 9 is a graph depicting the threshold field required to obtain a certain emitted current density for several field emission materials. In addition, the Applicants have amended the specification to expressly recite material describing FIG. 9 (formerly FIG. 4) that was incorporated by reference from the parent application. Accordingly, no new matter has been added.

The Applicants respectively assert that none of the cited documents disclose or suggest systems, devices, structures, or methods for generating and detecting x-rays including a field emissive material selected from the group consisting of single walled carbon nanotubes, double walled carbon nanotubes, multi wall carbon nanotubes, nanotubes comprising at least one non carbon element, or a nanorod/nanowire comprising at least one of a metal, a metal oxide, silicon, silicon carbide, silicon oxide, carbon nitride, boron nitride, boron carbide, or a chalcogenide, wherein the field emissive material has an emitted electron current density of at least $1mA/cm^2$ when the cathode is subjected to an applied electrical field of at least 2V/μm. As can be seen from FIG. 9, the random, single walled nanotubes of sample

#2 can produce a current density of a 1mA/cm^2 at the lower limit of the recited threshold electric field of 2V/μm.

Since none of the documents disclose or suggest the newly recited feature, each of the independent claims are their respective dependent claims are considered allowable for at least this reason.

In addition, new claims 75-82 recite that applying an electrical field of greater than 2 V/μm produces a stable current density of at least about 100 mA/cm^2. As can be seen from FIG. 9, the random, single walled nanotubes of sample #1 can produce a current density greater than 100mA/cm^2 at threshold electric field of greater than 2V/μm (e.g., approximately greater than 4.2 V/μm). Again, none of the cited documents discloses or suggests this feature. Therefore, these claims are considered allowable for these reasons as well.

Regarding claims 6 and 9, the Office asserts that FIG. 3 of Whitlock discloses the recited array of target material. Instead, the Applicants respectfully assert that FIG. 3 depicts an array of cathodes with a single anode target, not a plurality of individual target material as asserted by the Office. Accordingly, these claims are considered allowable for these reasons as well.

Finally, regarding the claim rejections based on Burke, the applications respectfully assert that persons skilled in the are would not be motivated to combine the teachings of Keesmann and Burke as the Office suggests. Burke describes arrangements using thermionic cathode structures. In the absence of any suggestion in the cited documents as how to modifying Burkes use of thermionic cathodes to operate within Keesmann's arrangements, one would have faced a serious engineering problem that naturally would have had a low probability of success without substantial experimentation and effort, especially in view of the need to modify the teachings of the documents. Accordingly, the Applicants respectfully request that these rejections be reconsidered and withdrawn as well.

For the foregoing reasons, Applicants believe entry of this Amendment would put the application in condition for allowance. Thus, it is respectfully requested that the Amendment be entered, and a Notice to this effect be provided. If any questions remain, the Examiner is invited to contact the undersigned at the below-listed telephone number.

Respectfully submitted,

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Date: July 21, 2004

Attachments: New Drawing Sheet

I hereby certify that this correspondence is being deposited with the U.S. Postal Service as First Class Mail in an envelope addressed to the Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Date of Deposit: July 21, 2004

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